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(56) Documents Cited

US 5101510 A

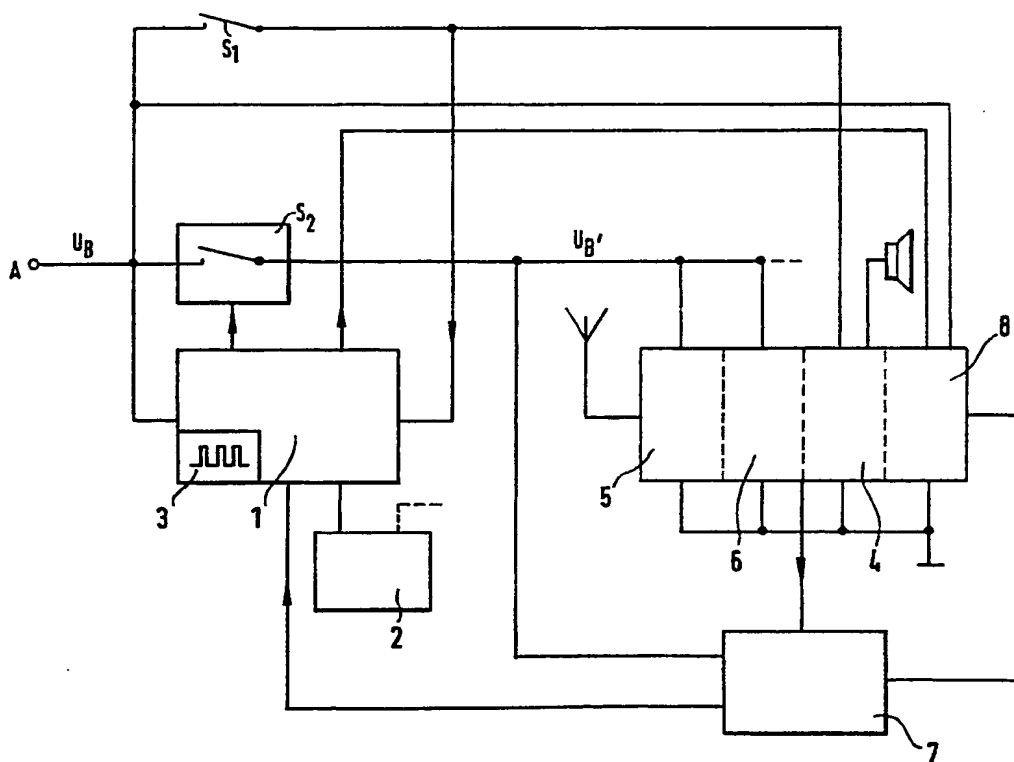
(58) Field of Search

**UK CL (Edition M) G4H HRCA , H3Q QRDS , H4L LECX
LERM LERX**

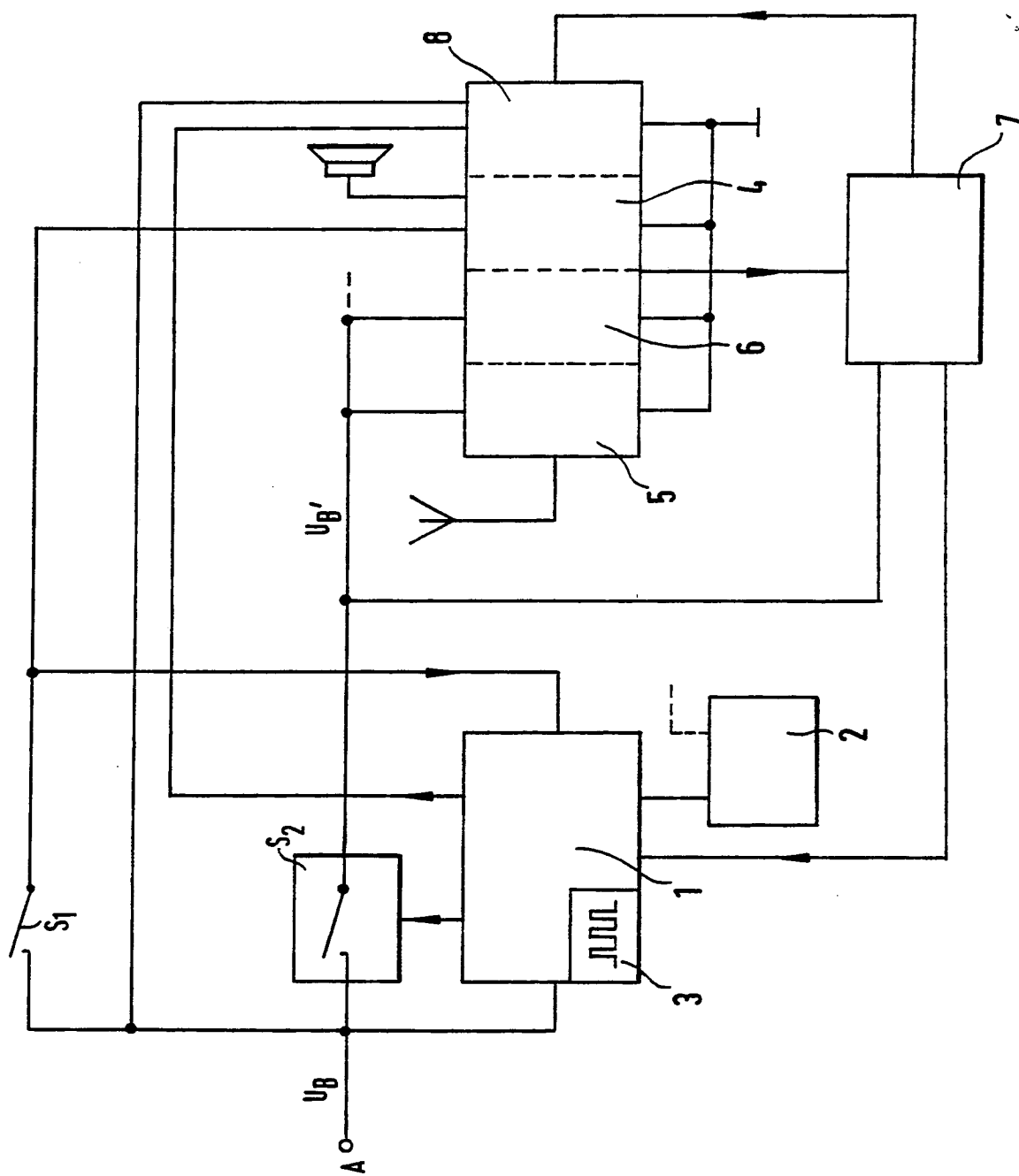
**INT CL⁵ G08G 1/09 1/0962 1/0967 , H04B 1/16
ONLINE DATABASES ; WPI**

(54) Battery saving circuit for a car radio with a decoder

(57) A car radio has a decoder eg. RDS decoder 7 and a memory for automatically recording messenger eg. traffic reports; parts of the circuitry not needed during the monitoring operation are switched off and the circuitry needed for monitoring is energised in a pulsed manner to reduce motor-vehicle batter discharge. During the transmission of a traffic report, the monitoring circuitry is energised continually.



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Car radio having a decoder for additional signals
and having a memory for transmitted information

The invention relates to a car radio having a decoder for receiving and decoding signals in addition to normal radio broadcasts and a decoder memory for recording any desired decoded information.

It is known to provide traffic announcements by a system known as RDS which announcements will be heard by a driver whether or not he is listening to the channel on which the traffic announcement is broadcast.

In order that the driver of a motor vehicle can listen to previously transmitted traffic announcements on starting his journey, it is necessary to design a car radio in such a way that it monitors and records traffic announcements in a predeterminable operating state.

DE 29 10 073 C2 discloses a car radio having a traffic-radio decoder and an automatically controlled recording and playback device provided with an automatic memory device having a digital memory. In addition, the car radio has a control circuit which is connected to the announcement identification decoder and is intended to cause reading and writing of traffic announcement signals to and from the memory. Since the operating means used for monitoring have to remain constantly switched on in such a car radio, if the motor vehicle is parked for a long time, the vehicle battery may be discharged to such an extent that the remaining battery charge is no longer sufficient to start the motor-vehicle engine.

German Patent Application P 42 28 116.4 proposes providing the operating voltage supply of a car radio with a circuit arrangement which supplies current only to the functional blocks necessary for monitoring a traffic-radio transmitter and for storage in order to

store traffic announcements automatically with the car radio switched off.

The object of the invention is to reduce the power normally consumed in monitoring and recording traffic announcements by the operating means necessary for the purpose in a car radio.

The present invention provides a car radio having a decoder for additionally transmitted signals and a decoder-controlled memory for recording any desired retrievable information, the operating means necessary for receiving and for decoding being connected to a terminal carrying operating voltage in a selectable monitoring operating state, the car radio having a control circuit which, in the monitoring operating state, drives an electronically controllable switch via which the operating voltage is supplied to the operating means necessary for receiving and for decoding additionally transmitted signals, in such a way that said operating means are energized in a pulsed manner and wherein the control circuit is driven by said operating means in such a way that the electronic switch is held in the switched-on state and the memory ready to record for the duration of a signal indicating the presence of information the electronic switch being thereafter again driven in a pulsed manner.

The advantages achieved by the invention are, in particular, that it makes possible the clocked energization of operating means of a car radio and enables a radio transmitter to be monitored for additional signals over a prolonged period of time without excessively discharging the motor-vehicle battery in the process.

Advantageous embodiments of the invention are specified in the sub-claims. To monitor traffic announcements, decoders in accordance with claims 2 and 3 can advantageously be used. According to claim 4, a

microcomputer can be used for the control circuit.

According to claim 5, a clock generator can advantageously be incorporated in the control circuit. Dimensioning the pulse lengths in accordance with claim 6 ensures that the start of a traffic announcement is also substantially detected and played back. Dimensioning the pulse length in accordance with claim 7 makes possible a relatively low energy consumption.

In order that the present invention be more readily understood, an embodiment of the invention will now be described by way of example with reference to the accompanying drawing showing a block diagram of an embodiment of the present invention. A terminal A of a car radio carrying the operating voltage U_B is connected to the inputs of an appliance switch S1 and of an electronically controlled switch S2, and also to a microcomputer which serves as control circuit 1. The control circuit 1, which is connected to an operating part 2, has a clock generator 3 which is capable of switching the electronic switch S2 in a pulsed manner via the control circuit 1. The output of the appliance switch S1 is connected to the control circuit 1 and to those parts of the radio which are not necessary for monitoring a traffic-radio transmitter and require a high power consumption, such as an audio frequency amplifier 4, illuminating means and the like. The output of the electronically controlled switch S2 is connected to those parts of the radio necessary for monitoring a transmitter which broadcasts traffic announcements, such as RF stage 5, IF stage 6 and signal decoder 7, an RDS decoder (radio-data-system decoder) being provided as signal decoder 7. One output of the signal decoder 7 connected downstream of the IF stage 6 is connected to the control circuit 1 and a further output to a memory 8 provided for recording and scanning traffic announcements.

If the appliance switch S1 is closed, the operating voltage U_B is fed to the AF stage 4 and to the control circuit 1, which in turn closes the electronic switch S2 and consequently also supplies the RF stage 5, the IF stage 6 and the signal decoder 7 with the operating voltage U_B . The car radio is consequently in normal operation. If the car radio is, however, only to monitor an RDS radio transmitter for traffic announcements, the appliance switch S1 should be opened, thereby switching off, in particular, the AF stage 4. The clock generator now comes into operation and drives the electronic switch S2 in such a way that the operating means 5, 6, 7 necessary for receiving and identifying traffic announcements are energized in a pulsed manner. If an announcement identification signal is now detected by the signal decoder 7 during one of the short switch-on phases of the operating voltage U_B' for the operating means 5, 6, 7, the control circuit 1 holds the electronically controlled switch S2 in the switched-on state during the period of the identification signal and switches the memory 8 so as to record the traffic announcement. The announcement identification signal, which also disappears after the traffic announcements has taken place, again switches the control circuit 1 so as to clock the electronically controlled switch S2. The car radio is now in the monitoring mode again and the latter is interrupted only by a fresh traffic announcement.

In accordance with current RDS parameters, a traffic announcement should start only about 1.6 seconds after the initiation of the traffic announcement identification signal, it is expedient to choose the intervals between two consecutive clock pulses of the operating voltage U_B' as ≤ 1.5 seconds. A pulse interval duration T_{off} of 1.5 seconds and a pulse duration T_{on} of 0.5 seconds results, for example, in a

reduction in the power consumption which the car radio would normally require for monitoring to:

$$\frac{T_{\text{on}}}{T_{\text{off}} + T_{\text{on}}} = \frac{0.5}{1.5 + 0.5} = 0.25$$

Stored traffic announcement are read out in a manner known per se. At this point, it may be pointed out that it is not only traffic announcement which can be monitored with the means specified. Also the exact duration T_{off} can be altered depending upon the parameters of the announcement.

CLAIMS:

1. A car radio having a decoder for additionally transmitted signals and a decoder-controlled memory for recording any desired retrievable information, the operating means necessary for receiving and for decoding being connected to a terminal carrying operating voltage in a selectable monitoring operating state, the car radio having a control circuit which, in the monitoring operating state, drives an electronically controllable switch via which the operating voltage is supplied to the operating means necessary for receiving and for decoding additionally transmitted signals, in such a way that said operating means are energized in a pulsed manner and wherein the control circuit is driven by said operating means in such a way that the electronic switch is held in the switched-on state and the memory ready to record for the duration of a signal indicating the presence of information the electronic switch being thereafter again driven in a pulsed manner.

2. A car radio according to claim 1, wherein said operating means includes a traffic-radio decoder for decoding the additional signals.

3. A car radio according to claim 1, wherein said operating means includes an RDS decoder for decoding the additional signals.

4. A car radio according to one of claims 1 to 3, wherein a microcomputer is provided as control circuit (1).

5. A car radio according to one of claims 1 to 4, wherein the control circuit (1) includes a clock

generator (3).

6. A car radio according to one of claims 1 to 5, wherein the pulse intervals between the clocked pulses of the operating voltage (U_B') have a pulse duration of (T_{off}) of ≤ 1.5 seconds.

7. A car radio according to one of claims 1 to 6, wherein the clocked pulses of the operating voltage (U_B') have a pulse duration (T_{on}) of about 0.5 seconds.

8. A car radio substantially as hereinbefore described with reference to the accompanying drawing.

Patents Act 1977

**Examiner's report to the Comptroller under Section 17
(The Search report)**

8.

Application number
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Relevant Technical Fields

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G4H: (HRCA)

(ii) Int Cl (Ed.5) G08G 1/09, 1/0962, 1/0967; H04B 1/16

Search Examiner
MR JOHN CAGE

Date of completion of Search
16 FEBRUARY 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE : WPI

Documents considered relevant
following a search in respect of
Claims :-
1-8

Categories of documents

- | | |
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| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&: Member of the same patent family; corresponding document.</p> |
|--|---|

Category	Identity of document and relevant passages	Relevant to claim(s)
X	US 5101510 (DUCKECK) - see Figure 1 and column 2 lines 1-13, column 4 lines 31-37	1-5 at least

Databases:The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).